Sai Krishna Deepak Maram

Cornell Tech, 2 West Loop Rd, NYC - 10044
sm2686@cornell.edu
https://sites.google.com/view/deepak-maram/home

Research Interests

Computer Security, Applied Cryptography, Blockchains

Education

2018 - present **Ph.D. in Computer Science**.
Cornell University, USA
Advisor: *Ari Juels*

2012 - 16 **B.Tech in Computer Science with Honors**.
Indian Institute of Technology, Bombay, India
GPA: 8.91/10

Publications

2019 **DECO: Liberating Web Data Using Decentralized Oracles**, `www.deco.works`.
F. Zhang, **S.K.D. Maram**, H. Malvai, S. Goldfeder, and A. Juels. (In submission.)
Designed a novel privacy-preserving oracle protocol that makes public and private data accessible to a rich spectrum of applications including smart contracts. DECO works with modern TLS versions and relies on optimized MPC and zero-knowledge techniques. Implemented the zero-knowledge techniques to prove arbitrary statements about underlying TLS-protected data.

2018 - 19 **CHURP: Dynamic-committee Proactive Secret Sharing**, `www.churp.io`.
S.K.D. Maram, F. Zhang, L. Wang, A. Low, Y. Zhang, A. Juels, and D. Song.
Proceedings of the 2019 ACM Conference on Computer and Communications Security (to appear).
Devised a novel cryptographic protocol to facilitate dynamic committees in secret sharing, thus enabling decentralized key storage. Improved the state-of-the-art protocol to incur atleast 1000x less communication cost for large committees.

2018 - 19 **SkinnerDB: Regret-Bounded Query Evaluation via Reinforcement Learning**.
I. Trummer, S. Moseley, **S.K.D Maram**, S. Jo, and A. Antonakakis.
Proceedings of the 2019 International Conference on Management of Data (SIGMOD).
Expanded the query processing engine of SkinnerDB to support a wide range of queries and implemented several query optimization strategies. Demonstrated orders of magnitude improvement over a traditional DBMS for several difficult-to-optimize queries.

2015 - 16 **Incentive Stackelberg Mean-payoff Games**.
A. Gupta, S. Schewe, A. Trivedi, **S.K.D. Maram**, P. Bharath Kumar
Proceedings of the 2016 Conference on Software Engineering and Formal Methods (SEFM).
Implemented a tool to demonstrate that incentive equilibria strategies perform better than other equilibria for playing multi-player mean-payoff games (MMPG).

Honors and Awards

2018 Awarded University Fellowship by Cornell University

2012 Secured All India Rank 12 in *IIT-JEE* out of 500,000 students

2012 Recipient of KVPY scholarship and attended VIJYOSHI Camp

2011 Awarded merit certificate for being in top 1% in National Standard Examination - Astronomy

Other Projects

Summer 2015 **SCION: Next generation Internet Architecture**, *ETH Zurich*.
Research Internship, *Guide: Prof.Adrian Perrig*
Devised a new category of attack in SCION that exploits the network architecture to break the system and suggested potential defenses that render such an attack impractical.

Summer 2015 **Efficient path-revocation system for SCION**, *ETH Zurich*.
Research Internship, *Guide: Prof.Adrian Perrig*
Developed an efficient and secure path-revocation system for source-controlled routing architectures like SCION. Implemented SCION-DSE, a discrete event simulator for SCION and experimentally evaluated it to show that SCION achieves 45x lesser packet overhead than BGP.

Spring 2015 **Experiments with wireless bit-rate adaptation**, *IIT Bombay*.
R&D Project, *Guide: Prof.Mythili Vutkuru*

Spring 2016 **Android malware detection using Unsupervised Machine Learning**, *IIT Bombay*.
Class Project, *Guide: Prof. Bernard Menzes*

Spring 2016 **Reinforcement Learning agents to solve maze games**, *IIT Bombay*.
Class Project, *Guide: Prof. Shivaram Kalyanakrishnan*

Industry Experience

2016 - 17 **Software Developer**, *Oracle*, Bangalore.
Worked in Server Technology group on the implementation of JSR 366 for the GlassFish web application server. Developed several core features in the deployment module which released in Java EE RI 8.

Summer 2014 **Software Developer Internship**, *Housing.com*, Mumbai.
Modeled and implemented an algorithm that optimizes the bids placed on ads displayed in Google Search Engine using Google AdWords API based on factors such as the number of clicks, cost and impressions.

Posters and Talks

Spring 2019 **CHURP: Dynamic-committee Proactive Secret Sharing**.
IC3 Winter Retreat, Interlaken

Fall 2018 **SkinnerDB: Regret-Bounded Query Evaluation via Reinforcement Learning**.
Poster presented at VLDB 2018, Rio

Summer 2015 **An attack on SCION and SCION Discrete Event Simulator**.
ETH Zurich

Fall 2014 **Algorithms for solving Parity Games**.
IIT Bombay

Teaching Experience

Fall 2015 **Department Academic Volunteer Program**.
Data Structures and Algorithms

Spring 2016 **Teaching Assistant**.
CS101: Computer Programming

Course Work

Graduate Advanced Programming Languages, Advanced Systems, Intro to Computer Vision, Security & Privacy Technologies, Cryptocurrency and Smart Contracts.

Undergrad Data Structures, Algorithm Design, Computer Networks, Discrete Structures, Computer Architecture, Database Systems, Operating Systems, Artificial Intelligence, Advances in Intelligent and Learning Agents, Advanced Network Security and Cryptography, Computational Ring Theory, Graph Theory.

Technical Skills

Languages C, C++, Python, Java, Rust, HTML, CSS, LaTeX, JS, SQL, PHP

Technologies Intel SGX, zkSNARK, TLS, ns3 (Network Simulator), PostgreSQL

Interests and Activities

2019 Serving as the treasurer of PhD student organization At Cornell Tech (PACT)

2014 Designed a Wireless Controlled Bot for *XLR8* competition at IIT Bombay that bagged the first prize

2005 - 07 Won first prize in several district-level chess competitions and participated in multiple state-level competitions